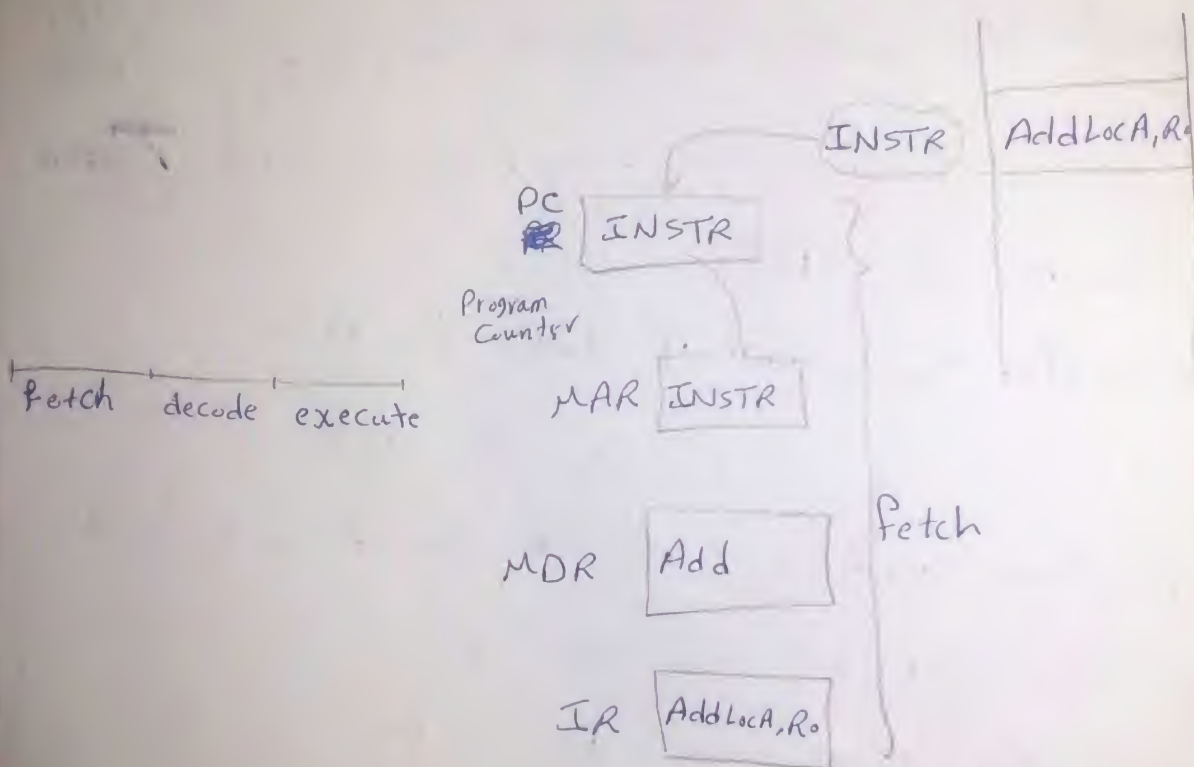


1 Add LocA, R<sub>0</sub>  
           ↓          ↓  
       src. destination  
 INSTR



(PC) ~~هو~~ الأمر موجود في خزانة (PC) فنقل العنوان لـ (MAR) فنقل به العنوان ويقوم بعدها بزيادة ما بداخل العنوان ثم يوفيه في (MDR) ثم نقل الأمر في (IR).  
 ثم ننزل محتوى (PC) واحد حتى يشير على الأمر التالي  
 ثم ننقل القيمة (A) في (A/a) ونجمعها مع "R<sub>0</sub>".

طريقة أخرى للأمر

→ first two steps on the question.

- 3- transfer Contents From MDR into "IR" and decode it
- 4- transfer the address location A From "IR" to <sup>MAR</sup>~~AMR~~
- 5- Issue a read Command and wait until ~~MDR~~ <sup>MAR</sup> data is loaded in "MDR".
- 6- transfer Contents of "MDR" to ALU.
- 7- " " of R<sub>0</sub> to "ALU".
- 8- perform addition of the two operands in "ALU" and transfer result into "R<sub>0</sub>".
- 9- transfer Contents of "PC" to "ALU"
- 10- Add 1 to operand in "ALU".





3

2] Add  $R_1, R_2, R_3$

الخطوات قبل كده موجوده في رقم (1)

4- transfer contents  $R_1, R_2$  to ALU

5- Perform addition of <sup>two</sup> operands to ALU and transfer answer into  $R_3$ .

6- transfer contents of PC to ALU.

7- Add 1 to operand in ALU.

3

a)

Load  $A, R_0$

Load  $B, R_1$

Add  $R_0, R_1$

Store  $R_1, C$

4

3

b)

MOV A, c

ADD B, c

5 a)

$$T = \frac{N * S}{R}$$

$$S_{Risc} = 1.2$$

$$S_{Cisc} = 1.5$$

~~$R_{Risc} = R_{Cisc}$~~

~~$\frac{N_c}{N_R} ??$~~

$$\frac{N_c}{N_R} ?? \quad \text{if } \frac{N_c}{N_R} = \frac{S_{Cisc}}{S_{Risc}} \quad T_{Cisc} = T_{Risc}$$

Sol

$$\frac{N_{Cisc} * S_{Cisc}}{R_{Cisc}} = \frac{N_{Risc} * S_{Risc}}{R_{Risc}}$$

$$\therefore \frac{N_c}{N_R} = \frac{1.2}{1.5} = 0.8 = 80\%$$



5

5

b)

$$R_{Risc} = 1.15 * R_{cisc}$$

$$\frac{N_c}{N_R} = \frac{1.2}{1.5 * 1.15} = 0.69$$

sheet 2

1

a)

PC

$n$

if word length = 2

$m$

no. of Fetches =  $m - n$

b)

PC  $\rightarrow n + K$

PC size

Sol

$(n + K - 1)$  no. of instructions (IR)

6

2

PC 1012

عائز خطرات ال Fetch  
لو كان ده محتوي ال (PC)

PC  $\rightarrow$  MAR

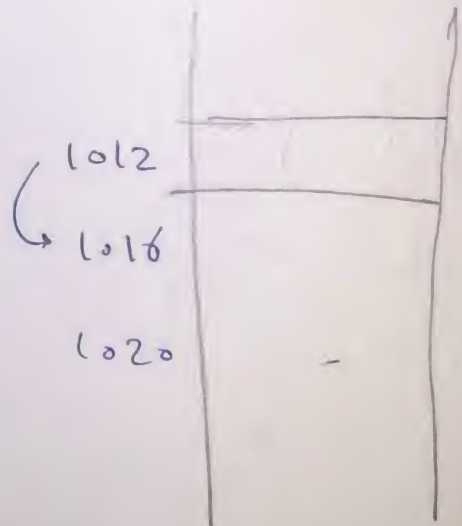
Read Command From memory

(MAR)  $\rightarrow$  MDR

MDR  $\rightarrow$  IR

PC  $\rightarrow$  ALU

PC  $\rightarrow$  PC + 4  
= 1016



الخطرات هتتكتب نرى مثال (1) 3 Sheet 1



7

3  
2-10

Move ~~#~~ AVEC, R1

Move ~~#~~ BVEC, R2

Move N, R3

clear R0

Loop Move (R1)+, R4

Multiply (R2)+, R4

Add R4, R0

Decrement R3

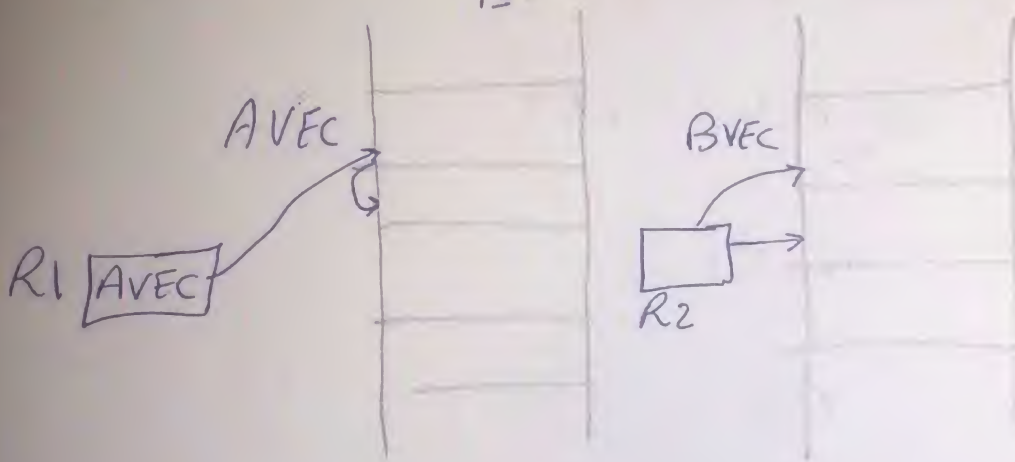
Branch >0 Loop

Move R0, DOT Product

شرح توفيقى للأوامر

البرنامج بينفذ القائمه الآتى

$$D.O.T \text{ Prod} = \sum_{i=0}^{n-1} A(i) \cdot B(i)$$



Move(R1) +, R4

المحتوى الذى داخل العنوان الذى يقار عليه ~~R1~~ ~~R2~~ ~~R3~~ ~~R4~~ ~~R5~~ ~~R6~~ ~~R7~~ ~~R8~~ ~~R9~~ ~~R10~~ ~~R11~~ ~~R12~~ ~~R13~~ ~~R14~~ ~~R15~~ ~~R16~~ ~~R17~~ ~~R18~~ ~~R19~~ ~~R20~~ ~~R21~~ ~~R22~~ ~~R23~~ ~~R24~~ ~~R25~~ ~~R26~~ ~~R27~~ ~~R28~~ ~~R29~~ ~~R30~~ ~~R31~~ ~~R32~~ ~~R33~~ ~~R34~~ ~~R35~~ ~~R36~~ ~~R37~~ ~~R38~~ ~~R39~~ ~~R40~~ ~~R41~~ ~~R42~~ ~~R43~~ ~~R44~~ ~~R45~~ ~~R46~~ ~~R47~~ ~~R48~~ ~~R49~~ ~~R50~~ ~~R51~~ ~~R52~~ ~~R53~~ ~~R54~~ ~~R55~~ ~~R56~~ ~~R57~~ ~~R58~~ ~~R59~~ ~~R60~~ ~~R61~~ ~~R62~~ ~~R63~~ ~~R64~~ ~~R65~~ ~~R66~~ ~~R67~~ ~~R68~~ ~~R69~~ ~~R70~~ ~~R71~~ ~~R72~~ ~~R73~~ ~~R74~~ ~~R75~~ ~~R76~~ ~~R77~~ ~~R78~~ ~~R79~~ ~~R80~~ ~~R81~~ ~~R82~~ ~~R83~~ ~~R84~~ ~~R85~~ ~~R86~~ ~~R87~~ ~~R88~~ ~~R89~~ ~~R90~~ ~~R91~~ ~~R92~~ ~~R93~~ ~~R94~~ ~~R95~~ ~~R96~~ ~~R97~~ ~~R98~~ ~~R99~~ ~~R100~~ ~~R101~~ ~~R102~~ ~~R103~~ ~~R104~~ ~~R105~~ ~~R106~~ ~~R107~~ ~~R108~~ ~~R109~~ ~~R110~~ ~~R111~~ ~~R112~~ ~~R113~~ ~~R114~~ ~~R115~~ ~~R116~~ ~~R117~~ ~~R118~~ ~~R119~~ ~~R120~~ ~~R121~~ ~~R122~~ ~~R123~~ ~~R124~~ ~~R125~~ ~~R126~~ ~~R127~~ ~~R128~~ ~~R129~~ ~~R130~~ ~~R131~~ ~~R132~~ ~~R133~~ ~~R134~~ ~~R135~~ ~~R136~~ ~~R137~~ ~~R138~~ ~~R139~~ ~~R140~~ ~~R141~~ ~~R142~~ ~~R143~~ ~~R144~~ ~~R145~~ ~~R146~~ ~~R147~~ ~~R148~~ ~~R149~~ ~~R150~~ ~~R151~~ ~~R152~~ ~~R153~~ ~~R154~~ ~~R155~~ ~~R156~~ ~~R157~~ ~~R158~~ ~~R159~~ ~~R160~~ ~~R161~~ ~~R162~~ ~~R163~~ ~~R164~~ ~~R165~~ ~~R166~~ ~~R167~~ ~~R168~~ ~~R169~~ ~~R170~~ ~~R171~~ ~~R172~~ ~~R173~~ ~~R174~~ ~~R175~~ ~~R176~~ ~~R177~~ ~~R178~~ ~~R179~~ ~~R180~~ ~~R181~~ ~~R182~~ ~~R183~~ ~~R184~~ ~~R185~~ ~~R186~~ ~~R187~~ ~~R188~~ ~~R189~~ ~~R190~~ ~~R191~~ ~~R192~~ ~~R193~~ ~~R194~~ ~~R195~~ ~~R196~~ ~~R197~~ ~~R198~~ ~~R199~~ ~~R200~~ ~~R201~~ ~~R202~~ ~~R203~~ ~~R204~~ ~~R205~~ ~~R206~~ ~~R207~~ ~~R208~~ ~~R209~~ ~~R210~~ ~~R211~~ ~~R212~~ ~~R213~~ ~~R214~~ ~~R215~~ ~~R216~~ ~~R217~~ ~~R218~~ ~~R219~~ ~~R220~~ ~~R221~~ ~~R222~~ ~~R223~~ ~~R224~~ ~~R225~~ ~~R226~~ ~~R227~~ ~~R228~~ ~~R229~~ ~~R230~~ ~~R231~~ ~~R232~~ ~~R233~~ ~~R234~~ ~~R235~~ ~~R236~~ ~~R237~~ ~~R238~~ ~~R239~~ ~~R240~~ ~~R241~~ ~~R242~~ ~~R243~~ ~~R244~~ ~~R245~~ ~~R246~~ ~~R247~~ ~~R248~~ ~~R249~~ ~~R250~~ ~~R251~~ ~~R252~~ ~~R253~~ ~~R254~~ ~~R255~~ ~~R256~~ ~~R257~~ ~~R258~~ ~~R259~~ ~~R260~~ ~~R261~~ ~~R262~~ ~~R263~~ ~~R264~~ ~~R265~~ ~~R266~~ ~~R267~~ ~~R268~~ ~~R269~~ ~~R270~~ ~~R271~~ ~~R272~~ ~~R273~~ ~~R274~~ ~~R275~~ ~~R276~~ ~~R277~~ ~~R278~~ ~~R279~~ ~~R280~~ ~~R281~~ ~~R282~~ ~~R283~~ ~~R284~~ ~~R285~~ ~~R286~~ ~~R287~~ ~~R288~~ ~~R289~~ ~~R290~~ ~~R291~~ ~~R292~~ ~~R293~~ ~~R294~~ ~~R295~~ ~~R296~~ ~~R297~~ ~~R298~~ ~~R299~~ ~~R300~~ ~~R301~~ ~~R302~~ ~~R303~~ ~~R304~~ ~~R305~~ ~~R306~~ ~~R307~~ ~~R308~~ ~~R309~~ ~~R310~~ ~~R311~~ ~~R312~~ ~~R313~~ ~~R314~~ ~~R315~~ ~~R316~~ ~~R317~~ ~~R318~~ ~~R319~~ ~~R320~~ ~~R321~~ ~~R322~~ ~~R323~~ ~~R324~~ ~~R325~~ ~~R326~~ ~~R327~~ ~~R328~~ ~~R329~~ ~~R330~~ ~~R331~~ ~~R332~~ ~~R333~~ ~~R334~~ ~~R335~~ ~~R336~~ ~~R337~~ ~~R338~~ ~~R339~~ ~~R340~~ ~~R341~~ ~~R342~~ ~~R343~~ ~~R344~~ ~~R345~~ ~~R346~~ ~~R347~~ ~~R348~~ ~~R349~~ ~~R350~~ ~~R351~~ ~~R352~~ ~~R353~~ ~~R354~~ ~~R355~~ ~~R356~~ ~~R357~~ ~~R358~~ ~~R359~~ ~~R360~~ ~~R361~~ ~~R362~~ ~~R363~~ ~~R364~~ ~~R365~~ ~~R366~~ ~~R367~~ ~~R368~~ ~~R369~~ ~~R370~~ ~~R371~~ ~~R372~~ ~~R373~~ ~~R374~~ ~~R375~~ ~~R376~~ ~~R377~~ ~~R378~~ ~~R379~~ ~~R380~~ ~~R381~~ ~~R382~~ ~~R383~~ ~~R384~~ ~~R385~~ ~~R386~~ ~~R387~~ ~~R388~~ ~~R389~~ ~~R390~~ ~~R391~~ ~~R392~~ ~~R393~~ ~~R394~~ ~~R395~~ ~~R396~~ ~~R397~~ ~~R398~~ ~~R399~~ ~~R400~~ ~~R401~~ ~~R402~~ ~~R403~~ ~~R404~~ ~~R405~~ ~~R406~~ ~~R407~~ ~~R408~~ ~~R409~~ ~~R410~~ ~~R411~~ ~~R412~~ ~~R413~~ ~~R414~~ ~~R415~~ ~~R416~~ ~~R417~~ ~~R418~~ ~~R419~~ ~~R420~~ ~~R421~~ ~~R422~~ ~~R423~~ ~~R424~~ ~~R425~~ ~~R426~~ ~~R427~~ ~~R428~~ ~~R429~~ ~~R430~~ ~~R431~~ ~~R432~~ ~~R433~~ ~~R434~~ ~~R435~~ ~~R436~~ ~~R437~~ ~~R438~~ ~~R439~~ ~~R440~~ ~~R441~~ ~~R442~~ ~~R443~~ ~~R444~~ ~~R445~~ ~~R446~~ ~~R447~~ ~~R448~~ ~~R449~~ ~~R450~~ ~~R451~~ ~~R452~~ ~~R453~~ ~~R454~~ ~~R455~~ ~~R456~~ ~~R457~~ ~~R458~~ ~~R459~~ ~~R460~~ ~~R461~~ ~~R462~~ ~~R463~~ ~~R464~~ ~~R465~~ ~~R466~~ ~~R467~~ ~~R468~~ ~~R469~~ ~~R470~~ ~~R471~~ ~~R472~~ ~~R473~~ ~~R474~~ ~~R475~~ ~~R476~~ ~~R477~~ ~~R478~~ ~~R479~~ ~~R480~~ ~~R481~~ ~~R482~~ ~~R483~~ ~~R484~~ ~~R485~~ ~~R486~~ ~~R487~~ ~~R488~~ ~~R489~~ ~~R490~~ ~~R491~~ ~~R492~~ ~~R493~~ ~~R494~~ ~~R495~~ ~~R496~~ ~~R497~~ ~~R498~~ ~~R499~~ ~~R500~~ ~~R501~~ ~~R502~~ ~~R503~~ ~~R504~~ ~~R505~~ ~~R506~~ ~~R507~~ ~~R508~~ ~~R509~~ ~~R510~~ ~~R511~~ ~~R512~~ ~~R513~~ ~~R514~~ ~~R515~~ ~~R516~~ ~~R517~~ ~~R518~~ ~~R519~~ ~~R520~~ ~~R521~~ ~~R522~~ ~~R523~~ ~~R524~~ ~~R525~~ ~~R526~~ ~~R527~~ ~~R528~~ ~~R529~~ ~~R530~~ ~~R531~~ ~~R532~~ ~~R533~~ ~~R534~~ ~~R535~~ ~~R536~~ ~~R537~~ ~~R538~~ ~~R539~~ ~~R540~~ ~~R541~~ ~~R542~~ ~~R543~~ ~~R544~~ ~~R545~~ ~~R546~~ ~~R547~~ ~~R548~~ ~~R549~~ ~~R550~~ ~~R551~~ ~~R552~~ ~~R553~~ ~~R554~~ ~~R555~~ ~~R556~~ ~~R557~~ ~~R558~~ ~~R559~~ ~~R560~~ ~~R561~~ ~~R562~~ ~~R563~~ ~~R564~~ ~~R565~~ ~~R566~~ ~~R567~~ ~~R568~~ ~~R569~~ ~~R570~~ ~~R571~~ ~~R572~~ ~~R573~~ ~~R574~~ ~~R575~~ ~~R576~~ ~~R577~~ ~~R578~~ ~~R579~~ ~~R580~~ ~~R581~~ ~~R582~~ ~~R583~~ ~~R584~~ ~~R585~~ ~~R586~~ ~~R587~~ ~~R588~~ ~~R589~~ ~~R590~~ ~~R591~~ ~~R592~~ ~~R593~~ ~~R594~~ ~~R595~~ ~~R596~~ ~~R597~~ ~~R598~~ ~~R599~~ ~~R600~~ ~~R601~~ ~~R602~~ ~~R603~~ ~~R604~~ ~~R605~~ ~~R606~~ ~~R607~~ ~~R608~~ ~~R609~~ ~~R610~~ ~~R611~~ ~~R612~~ ~~R613~~ ~~R614~~ ~~R615~~ ~~R616~~ ~~R617~~ ~~R618~~ ~~R619~~ ~~R620~~ ~~R621~~ ~~R622~~ ~~R623~~ ~~R624~~ ~~R625~~ ~~R626~~ ~~R627~~ ~~R628~~ ~~R629~~ ~~R630~~ ~~R631~~ ~~R632~~ ~~R633~~ ~~R634~~ ~~R635~~ ~~R636~~ ~~R637~~ ~~R638~~ ~~R639~~ ~~R640~~ ~~R641~~ ~~R642~~ ~~R643~~ ~~R644~~ ~~R645~~ ~~R646~~ ~~R647~~ ~~R648~~ ~~R649~~ ~~R650~~ ~~R651~~ ~~R652~~ ~~R653~~ ~~R654~~ ~~R655~~ ~~R656~~ ~~R657~~ ~~R658~~ ~~R659~~ ~~R660~~ ~~R661~~ ~~R662~~ ~~R663~~ ~~R664~~ ~~R665~~ ~~R666~~ ~~R667~~ ~~R668~~ ~~R669~~ ~~R670~~ ~~R671~~ ~~R672~~ ~~R673~~ 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~~R1006~~ ~~R1007~~ ~~R1008~~ ~~R1009~~ ~~R1010~~ ~~R1011~~ ~~R1012~~ ~~R1013~~ ~~R1014~~ ~~R1015~~ ~~R1016~~ ~~R1017~~ ~~R1018~~ ~~R1019~~ ~~R1020~~ ~~R1021~~ ~~R1022~~ ~~R1023~~ ~~R1024~~ ~~R1025~~ ~~R1026~~ ~~R1027~~ ~~R1028~~ ~~R1029~~ ~~R1030~~ ~~R1031~~ ~~R1032~~ ~~R1033~~ ~~R1034~~ ~~R1035~~ ~~R1036~~ ~~R1037~~ ~~R1038~~ ~~R1039~~ ~~R1040~~ ~~R1041~~ ~~R1042~~ ~~R1043~~ ~~R1044~~ ~~R1045~~ ~~R1046~~ ~~R1047~~ ~~R1048~~ ~~R1049~~ ~~R1050~~ ~~R1051~~ ~~R1052~~ ~~R1053~~ ~~R1054~~ ~~R1055~~ ~~R1056~~ ~~R1057~~ ~~R1058~~ ~~R1059~~ ~~R1060~~ ~~R1061~~ ~~R1062~~ ~~R1063~~ ~~R1064~~ ~~R1065~~ ~~R1066~~ ~~R1067~~ ~~R1068~~ ~~R1069~~ ~~R1070~~ ~~R1071~~ ~~R1072~~ ~~R1073~~ ~~R1074~~ ~~R1075~~ ~~R1076~~ ~~R1077~~ ~~R1078~~ ~~R1079~~ ~~R1080~~ ~~R1081~~ ~~R1082~~ ~~R1083~~ ~~R1084~~ ~~R1085~~ ~~R1086~~ ~~R1087~~ ~~R1088~~ ~~R1089~~ ~~R1090~~ ~~R1091~~ ~~R1092~~ ~~R1093~~ ~~R1094~~ ~~R1095~~ ~~R1096~~ ~~R1097~~ ~~R1098~~ ~~R1099~~ ~~R1100~~ ~~R1101~~ ~~R1102~~ ~~R1103~~ ~~R1104~~ ~~R1105~~ 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~~R1306~~ ~~R1307~~ ~~R1308~~ ~~R1309~~ ~~R1310~~



## السؤال !!!

← متعلمش أي عمليات حسابية (لا إذا كانا بين "2 register"

← Load, Store

ال Sol

Move ~~#~~ AVEC, R1

Move ~~#~~ <sup>B</sup> VEC, R2

Load N, R3

clear R0

Loop Load (R1) +, R4

Load (R2) +, R5


Multiply R5, R4

Add R4, R0

Decrement R3

Branch 70 Loop

store R0, DOTPROD

← (data) بنقل    
 ← باستخدام Load

4 effective address

$$\underline{2-13} \quad R1 = 1200, R2 = 4600$$

a) Load  $20(R1), R5$

$$EA = 20 + 1200 = 1220$$

b) Move  $\#3000, R5$

EA = No EA  $\rightarrow$  immediate operand part of the instruction

c) store  $R5, 30(R1, R2)$

$$EA = 30 + 1200 + 4600 = 5830$$

d) Add  $-(R2), R5$

$$EA = 4600 - 1 = 4599$$

$\downarrow$   
word (1 byte)

e) Subtract  $(R1)+, R5$

$$EA = 1200$$

$$\begin{aligned} &\cancel{X(Ri)} \rightarrow X + Ri \\ &\cancel{(Ri + Rj)} \rightarrow Ri + Rj \end{aligned}$$

$$X(Ri) \rightarrow X + Ri$$

$$(Ri + Rj) \rightarrow Ri + Rj$$

$$X(Ri, Rj) \rightarrow X + Ri + Rj$$